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## The Federal Government Takes Three Giant Steps for Micrographics



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### INTRODUCTION

*The U. S. Government is at the forefront in the advancement of information technology.*

*Federal obligations, for example, for scientific and technical information\* (STINFO), increased fivefold from \$75.9 million to \$384.9 million between 1960 and 1970. During this time period approximately \$66.5 million was spent for research and development in informative services, documentation and information systems, and techniques and devices, up from \$2.9 million in 1960.*

*During this decade, our own micrographic industry has benefited greatly from these federal programs. Today the demand for microforms from the National Technical Information Service (NTIS); the Defense Documentation Center (DDC); the Atomic Energy Commission (AEC); the National Aeronautics and Space Administration (NASA); and the Educational Resources Information Centers (ERIC) exceeds 20 million microfiche annually.*

*In addition to federal information obligations for STINFO, there have been many other obligations as well, for social security, military records, intelligence operations and the like, involving the implementation of micrographic systems.*

*During the past 12 months, federal obligations and decisions on behalf of micrographic technology have been especially significant. The U. S. Government Printing Office (GPO) has requested permission from the Joint Congressional Committee on Printing to offer for sale its titles in microforms through the Superintendent of Documents. The Department of Defense (DOD) is implementing a new extensive micropublishing program for its Federal Catalog System. The*

*Committee on Scientific and Technical Information (COSATI) has adopted the NMA 98-frame, 24X microfiche standard.*

*These steps mark bold federal government actions to expand the use of microfiche on a logical and economical basis. It should be noted that the GPO and COSATI decisions to adopt the NMA 98-frame, 24X microfiche standard for microfilming source documents (paper), taken along with the DOD Federal Catalog System decision to adopt a 48X reduction for computer output microfilm, provide consolidation of microfiche formats and an orderly development of micrographic systems.*

*The impact of these government decisions are reviewed in this article.*

### U. S. GOVERNMENT PRINTING OFFICE (GPO)

On December 2, 1970, at an NMA news briefing, the late Honorable A. N. Spence, II, Public Printer of the United States, announced that he had requested permission from the Joint Congressional Committee on Printing to make Government Printing Office publications available in microform.

The GPO is the largest publisher in the world. It: (a) stocks and issues 27,000 publications; (b) received 5.1 million orders for 82 million publications last year; (c) issues 12 million publications each year automatically to 1,041 depository libraries; and (d) sold \$21 million worth of publications last year.

In April 1971, Mr. Spence formed a GPO Micropublishing Advisory Committee to make recommendations on this program. The Advisory Committee consists of Robert F. Haynes (GPO) as Chairman, Dr. Lee G. Burchinal (Office of Education), Peter Urbach (NTIS), Walter Chris-

\*National Science Foundation Study.

tensen (DOD), Charles LaHood (Library of Congress), Dr. Vernon D. Tate (NMA), George Bernstein (Navy), James Coulter (NSA), Forrest Carhart, Jr. (ALA), and Henry Powell (IIA). With industry cooperation, the Advisory Committee conducted tests at reductions of 24X, 32X, and 48X. The tests indicated that readability of duplicates at 48X was not up to acceptable quality. In general, both initial production problems and reproduction problems in the field become more difficult at higher reductions.

The Advisory Committee made the following recommendations to the Public Printer:

- For reproduction and record purposes, the GPO should micro-reproduce all documents as made available to depository libraries.
- The Public Printer should consider a dual micrographic system incorporating the standard 98-frame, 105 x 148.75mm microfiche and roll microfilm (details regarding roll film are still under consideration);
- Distribution of the microforms should be made optional to depository librarians. The depository librarian may receive either paper or microform copies without charge. Microform copies should be made available at a fee to the public.

Due to the magnitude and scope of GPO's micropublishing program, it will probably be the largest micropublishing venture in the world. Mr. Spence will be remembered for bringing the modern publishing technique to GPO. This program will save the taxpayers considerable money, and spur the entire micrographic industry. It should create many new users of microforms, help establish standards, and result in extensive purchases of equipment and supplies.

The Advisory Committee supported Mr. Spence's position of using existing commercial vendors for GPO's production of microforms. Therefore, the industry's systems service companies should have a chance at bidding on and obtaining the contract for this very large micropublishing venture.

GPO is also reviewing the problem of bibliographic control of federal government publications. The following items are being considered:

- Automation of GPO's records so that annual accumulations of listings in indexes can be made available to the public promptly;
- Designing a new system of bibliographic control for federal government publications, particularly the relationship between the GPO Monthly Catalog, the NTIS

Government Reports Announcements, Government Reports Index, and the cataloging effort of the Library of Congress.

#### DEPARTMENT OF DEFENSE (DOD) AND THE FEDERAL CATALOG SYSTEM - MINI-CATS REPORT\*

MINI-CATS is the acronym for Miniaturization of Federal Catalog System publications. The following are the salient characteristics of the Federal Catalog System:

- 4.5 million items are cross-referenced to more than 9 million reference numbers;
- Most sections of the catalog are computer produced;
- One complete catalog is several hundred thousand pages - 642,000 original pages in one year;
- Duplicate copies are distributed to thousands of DOD libraries - 1.8 billion copy pages in one year;
- Additions, deletions, and modifications require frequent updating of the catalog.

All of the above comprise the ingredients for consideration of a micrographic system! On November 25, 1970, the Assistant Secretary of Defense (Installations and Logistics) directed that a detailed study be made to develop recommendations for a type of microform and a compatible reader to be used throughout the Department of Defense for the publication, distribution, and retrieval of Federal Catalog System and Defense Integrated Data System publications. Within this overall picture, the study had three objectives:

- Evaluate the availability and applicability of advanced microforms and equipments to the Federal Catalog System and Defense Integrated Data System publications;
- Recommend a type of microform and compatible reader/display hardware for standardization throughout the DOD;
- Develop a proposed procurement specification for use by all DOD components in acquiring the standard microform and retrieval equipment.

The Study Group consisted of one representative each from the Departments of the Army, Navy, and Air Force, the Defense Supply Agency

\*Copies of the complete report on "Miniaturization of Federal Catalog System Publications (MINI-CATS)", HLR 72-1 may be obtained from Mr. Francis L. Kucht, DSA-DIDSO, Headquarters, Defense Supply Agency, Cameron Station, Alexandria, Virginia 22314.

(DSA), the General Services Administration (GSA), and the Government Printing Office (GPO), plus four representatives from the Analysis Division Staff. The group was headed by Douglas H. Lambert of the Office of the Assistant Secretary of Defense (Installations and Logistics).

The Study Group collected and reviewed data, statistics, and costs. The Group did field research — reviewed other micrographic applications, both within government and in industry. All microforms and reductions from 20X to 210X were considered. The production problems, as well as the user equipment requirements, were looked at. All in all, a very comprehensive study was made.

The following requirements were established for distributing and using data of the magnitude of the Federal Catalog System:

From the Catalog User's standpoint — it should provide:

- Ease of data look-up;
- Correct, up-to-date information;
- Ease of handling;
- Easy to read data; and
- Minimum file maintenance.

From the Producer's standpoint — it should provide:

- Ease and speed of production; and
- Ease and speed of distribution.

From an Overall System standpoint — it should provide:

- Maximum automation of processes to assure quality and speed;
- System simplicity to assure understanding; and
- Sufficient control to assure quality and consistency of data.

Interpreted in terms of a microfilm application, the form, retrieval equipment, and system needed to meet the catalog publication requirements listed above should have the following characteristics:

The form should:

- Provide a significant degree of compaction;
- Have a high quality of readability;
- Permit short production and distribution leadtime; and
- Permit rapid, easy update of user films; preferably, it should permit complete user-file replacement.

The retrieval equipment should:

- Be extremely reliable (i.e., require minimum maintenance and few part replacements);
- Provide ease of operation;

- Provide a high quality of readability; and
- Be adaptable to the user's environment.

The overall system should:

- Be relatively simple;
- Provide for maximum automation of processes;
- Be flexible and capable of expansion;
- Be adaptable to standardization; and
- Provide for ease of data retrieval.

The following analysis (Figure 1) of the page distribution and number of issues of a particular portion of the catalog is typical of the studies made by the Study Group before recommending a microform and reduction.

Page Range	No. Issues	% Issues	Total Original Pages	Total Copy Pages
1- 60	222	37.1	6,431	29,733,624
61- 98	72	12.0	5,840	24,425,396
99- 200	101	16.9	14,208	73,840,930
201- 300	57	9.5	14,346	84,740,924
301- 400	59	9.9	20,590	122,920,206
401- 500	45	7.5	19,865	130,678,380
501- 600	15	2.5	8,212	40,185,138
601- 1000	20	3.3	15,178	106,871,620
1001- 2000	5	.8	7,012	23,579,614
2001- 3000	2	.3	4,284	15,065,200
<b>Totals</b>	<b>598</b>	<b>100.0</b>	<b>115,966</b>	<b>652,041,032</b>
<b>Averages</b>	<b>/ / / /</b>	<b>/ / / /</b>	<b>194</b>	<b>1,090,370</b>

Source: Service/Agency Catalog Data Submission

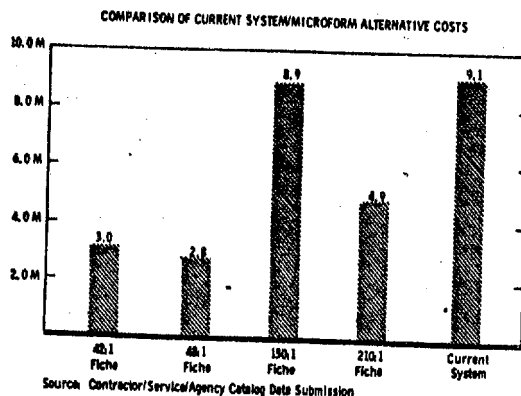
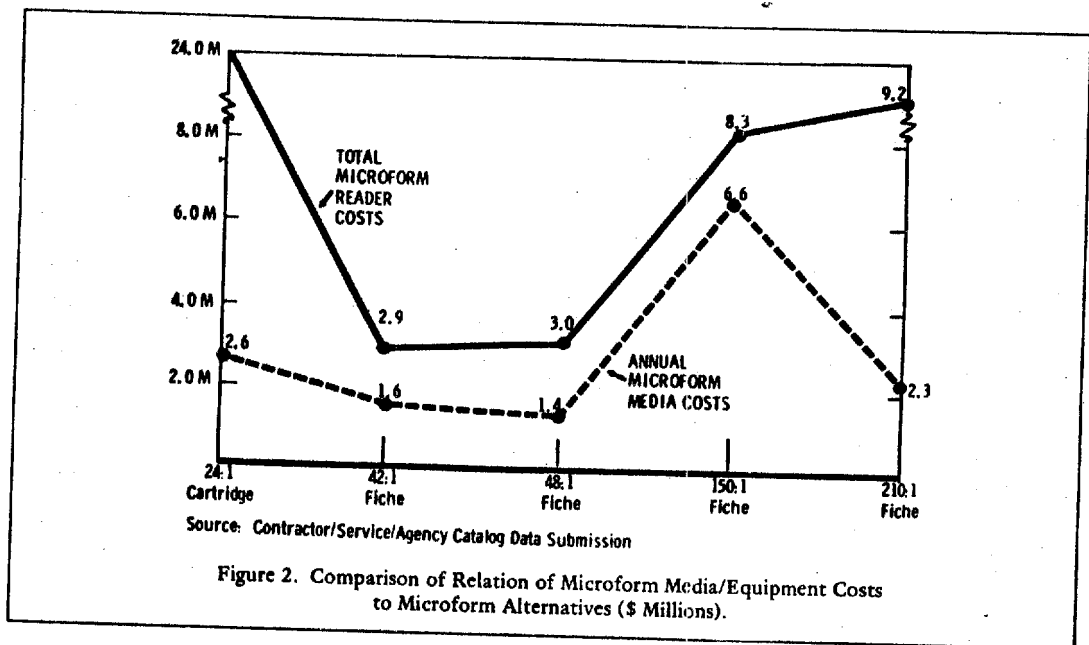
Figure 1. Catalog Publication Volume Statistics.  
(Summary of Basic Identification Lists — 1970)

The following analysis (Figure 2) of equipment and microfilm media costs for each microform and reduction was considered.

The total annual systems costs for microfiche at various reductions was compared to the then current (1970) cost of producing paper catalogs (Figure 3).

Two major conclusions were reached by the Study Group: (1) the rearrangement of production processing volume for certain Federal Catalog System publications would result in lower production costs; and (2) the microform system for miniaturization of Federal Catalog Systems publications offering the most optimum combination of costs and benefits is microfiche at a 48X reduction.

The microfiche format recommended for the 48X microfiche is shown in Figures 4 and 5. This format is designed around an equivalent 11" x 14" document. The grid is an outgrowth of the NMA 24X COM microfiche standard format A3 (Figure 6, NMA MS2-1971). Each frame in the A3, 24X format was divided in half horizontally and vertically to provide for 48X reductions and provide four times as many frames, but remain compatible.



The following recommendations were made to DOD:

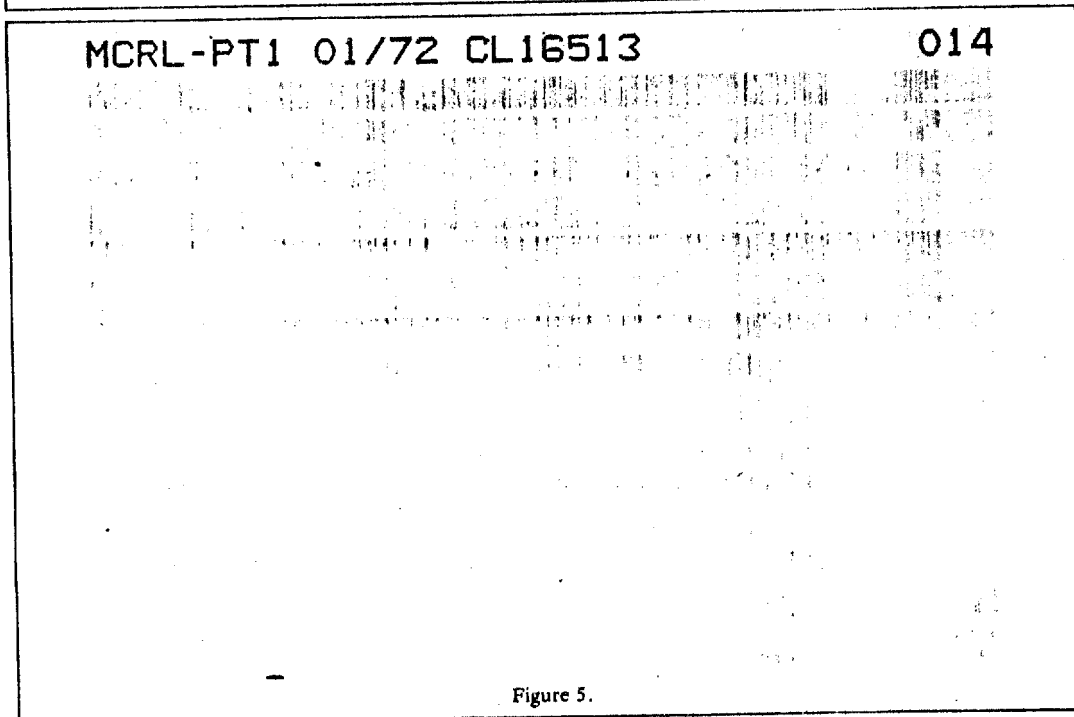
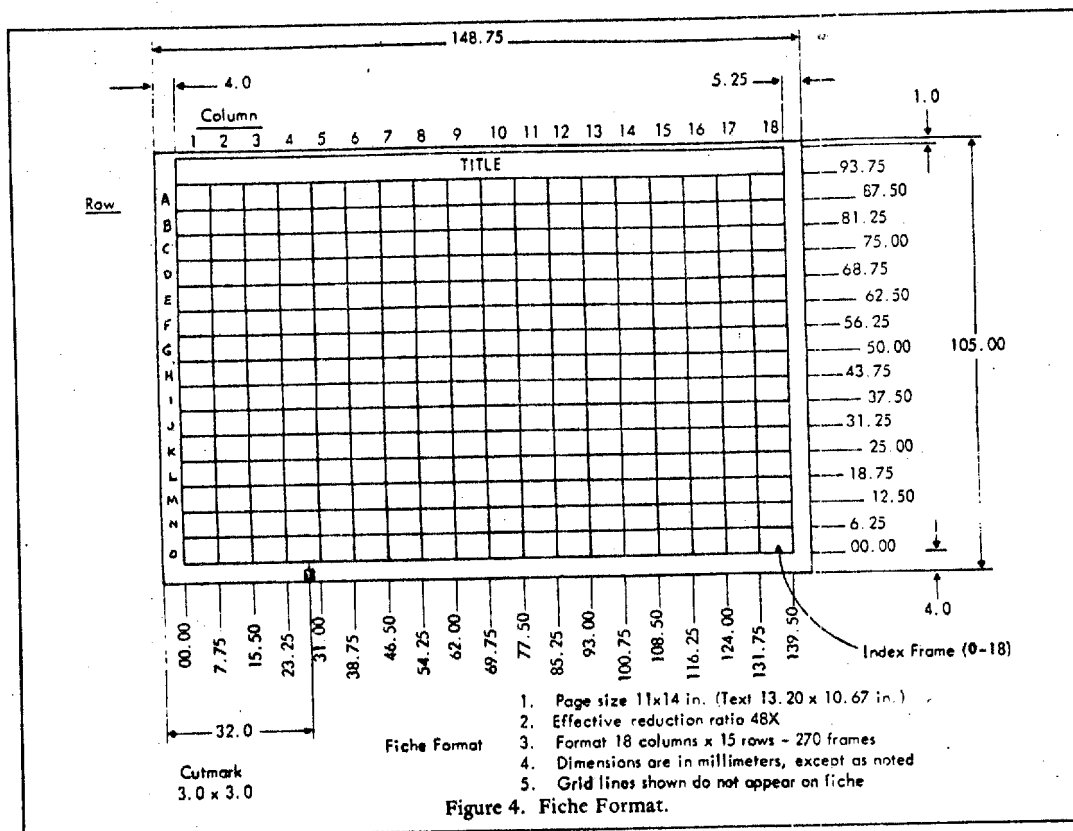
- Funds should be provided in the next budget submission for microfiche equipment procurement;
- A single procurement agent should be selected and assigned the responsibility for the procurement of standard retrieval equipment;
- The military services and the Defense Supply Agency should be directed to obtain microfiche equipment required at the earliest possible time, with the objective of having readers on hand during calendar year 1972, and at the latest, by 1 July 1973;

- The military services and the Defense Supply Agency should divert funds, currently budgeted for the publication, distribution, and storage of hard copy catalogs, to the procurement of microfiche (48X).

In accordance with the Study Group's recommendations, the Defense Supply Agency allocated funds to initiate procurement action for approximately 25,000 microfiche readers (of the type shown in Figure 6) to be delivered over a twelve month period, and prepared a schedule for the project.

The schedule, through the delivery of the first increment of viewers, is as follows:

- 27 January 1972 — Initiated Procurement action
- 4 February 1972 — Issued Solicitation — IFB.
- 3 March 1972 — Invitation for bids opened.
- 24 March 1972 — Abstracting, evaluation of solicitation, prepare Pre-Award Survey, EEO Survey, etc.
- 10 April 1972 — Pre-Award Survey Performance by DCAS.
- 14 April 1972 — Award made.
- 12 June 1972 — First article testing and pre-production sample by the contractor due.
- 26 June 1972 — Evaluation of First Article Test by Government due.
- 1 September 1972 — First deliveries scheduled.



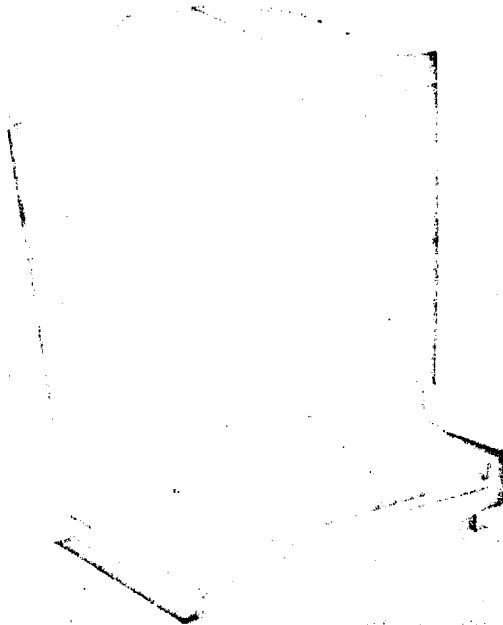


Figure 6. Microfiche Reader.

#### COMMITTEE ON SCIENTIFIC AND TECHNICAL INFORMATION (COSATI)

COSATI is the Committee on Scientific and Technical Information of the Federal Council for Science and Technology, Executive Office of the President. The Committee Chairman is Melvin S. Day, Office of Science Information Service. The Committee is composed of federal agencies responsible for operating scientific and technical information systems. Five agencies are among the largest producers of microfiche in the world. The agencies are: National Technical Information Service (NTIS); Defense Documentation Center (DDC); Atomic Energy Commission (AEC); National Aeronautics and Space Administration (NASA); and the Office of Education (OE). During 1971 these agencies produced a combined total in excess of 20 million microfiche for distribution.

In 1963, the National Microfilm Association issued an industry standard for microfiche providing for two formats of the 105mm x 148.75mm size. One format provided 98 frames (14 columns and 7 rows) with images reduced 24X, and a second format provided 60 frames (12 columns and 5 rows) with images reduced 20X. Most of the industry over the years has used the 98-frame format and it has become known as the "NMA Standard". In June of 1965, COSATI standardized a 60-frame format with reductions

of 18X to 20X. This 60-frame format has become known as the "COSATI Standard", and most federal government agencies have used this format. In 1965, the feeling was that government documents, being in poor condition, could not tolerate reductions greater than 20X.

In 1971, COSATI reconsidered its microfiche standard. During the past eight years, preparation of documents has improved and there have been a number of improvements in micrographic technology. Film emulsions and lenses have been improved and computer output microfilm (COM) has been developed. The use of different formats for government and industry has also caused problems.

The following factors were considered by COSATI:

1. **Economics.** The 98-frame format holds 50% more pages of information than does the 60-frame format; therefore, many documents can be accommodated on one, instead of two, microfiche. When an individual document has hundreds or even thousands of duplicates produced, savings are substantial. At NTIS, for example, the average document has 75 pages requiring two microfiche per title on the 60-frame format, and only one fiche on the 98-frame format. On this subject the Public Printer of the U. S., The late Honorable A. N. Spence, II, said "From a production cost standpoint, 20X is totally unacceptable to the Government Printing Office". The one-time production equipment conversion costs to change from 20X to 24X for AEC, DDC, NASA, and NTIS, was estimated at \$575,000. The annual savings to the agencies was estimated at over \$320,000. Therefore, the changeover would be paid for in 21 months and from then on, there would be considerable savings.
2. **Image Quality and Reduction Compatibility.** COSATI determined that a change from the 60-frame to the 98-frame format would result in only a negligible effect on most users. There is no effect in the area of fiche duplication. Readers and reader-printers with 18X to 20X magnification will have slightly reduced image blowbacks, but no significant effect on readability. Through normal attrition and expansion programs, readers can be upgraded to magnifications of 22X to 24X.
3. **Quantity and Microform Compatibility.** In a study<sup>1</sup> of the micropublishing field,

Yerkes-Wolf Associates determined that during 1970, 38 million fiche were produced at reductions of 18X to 20X, and 50 million fiche were produced at reductions of 24X. In addition, they determined that over 500 million feet of 16mm microfilm was duplicated and distributed in micro-publishing systems during the same year. It is important that microfiche produced by government for dissemination to industry be compatible with microfiche produced by industry for itself. It is also desirable for the reduction and frame size of microfiche to be compatible with 16mm roll microfilm. If this were true, readers could be designed to accommodate both microforms.

readers and reader-printers, compatibility is a necessity. COM recorders do generate film at 24X, but are not commercially available at 20X.

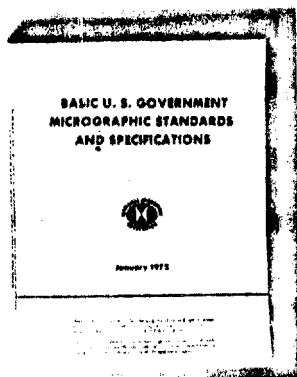
On July 27, 1971, the Federal Council for Science and Technology accepted the COSATI recommendation that the 60-frame, 20X standard for microfiche be replaced with the NMA 98-frame, 24X standard. This recommendation was accepted with the proviso that each Federal agency will implement the 24X standard in accordance with each agency's ability to obtain the necessary resources for the changeover. This change is scheduled for implementation at NTIS and DDC during February and March of 1972.

4. COM and Non-COM Compatibility. As computer output microfilm (COM) and conventional source document microfilm (non-COM) are used more and more in the same systems by the same users on the same

<sup>1</sup> MP 71-80 *Micropublishing 1971-1980*, prepared by Yerkes-Wolf Associates, Inc., 880 Scarsdale Avenue, Scarsdale, New York 10583. July 1971.



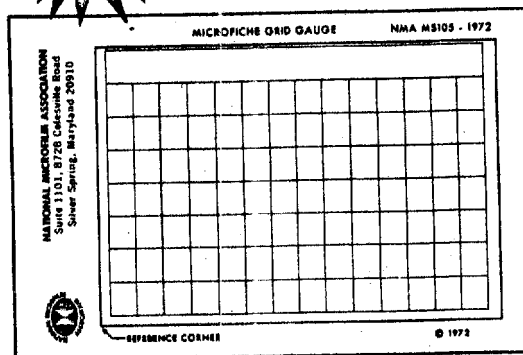
## STANDARDS



### BASIC U. S. GOVERNMENT MICROGRAPHIC STANDARDS AND SPECIFICATIONS RS1-1972

This book contains 360 pages providing copies of 19 standards and specifications, in effect all Federal Government Standards and Specifications. This 1972 edition replaces NMA Monograph No. 1 of 1967.

Price: Member — \$6.50 Non-Member — \$7.50



### MICROFICHE GRID GAUGE MS105-1972

A transparent device for checking microfiche containing the 98 frame NMA format.

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